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SLUSHING COMPOSITIONS

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This invention is directed toward the preparation of a slushing compound which is capable of depositing a continuous protective waxy film on metal surfaces in one cold application.

Whenever a wax coating is required as a protective anti-corrosion film on metal surfaces, it has been customary to resort to one of the following methods.

(1) To apply successive coats of wax solution in organic solvents such as naphtha, one application being insufficient because of the very low solubility of waxes in petroleum and other known reasonably priced solvents. For instance, the solubility of micro-crystalline wax 160° F. MP at 70° F. in ordinary Stoddard solvent is in the order of 2%. The solubility of a lower melting point wax is somewhat higher but still within the order of 4–5%.

(2) Hot dipping of metal parts in molten wax. This process has all known disadvantages of handling hot materials, the necessity of more expensive dipping equipment with heating coils, deterioration of wax through oxidation and poor control of the thickness of the film.

This invention has for its object the provision of a slushing compound capable of being utilized in the form of a cold spray, cold dip, or "painted on," or similar cold application method which can carry and deposit enough waxy material in a single application to give efficient covering and protection against corrosion and rust damage by atmospheric agencies.

It has been discovered that more wax can be held in naphtha, uniformly distributed, if small amounts of gel-forming materials are added to the naphtha. Aluminum soaps of fatty acids, such as aluminum stearate, aluminum naphthenate, aluminum resinates of various origin and the like, are suitable for the purpose.

Example I

As an example of the above composition of matter we give below the composition of one such compound:

	Per cent by weight
155° F. MP micro-crystalline wax	15
122° F. MP paraffin wax	10
VM and P naphtha	74.85
Aluminum stearate	.15
Total	100.00

The efficacy of the slushing compound prepared in accordance with the above invention was demonstrated by simulated service tests known as Navy salt spray test described in the proceedings of the A. S. T. M., vol. 33, 1933, part 1, page 184, and so called condensation bath tests developed in the industry but not accepted yet by recognized technical societies. In the Navy salt spray bath, specimens of metals or metal parts are suspended in a corrosion proof non-metallic bath and subjected to salt water spray. The concentration of salt in the water is 4% NaCl. The spraying is done in 20 minute periods twice a day for five consecutive days. At the end of this period the specimens must not show any signs of corrosion upon the removal of slushing compounds with solvents.

In the condensation bath the specimens are kept in a bath with rigidly controlled temperature and humidity for twenty days. The period of condensation of moisture is followed by a drying period, a complete cycle consisting of 24 hours of alternate condensation and drying. In other words, a complete test covers 20 cycles. At the end of the 20 day period, the specimens should not show signs of corrosion or discoloration.

The naphtha slushing compound described herein has passed the Navy test (20 days) and the condensation bath (20 days) without any signs of corrosion or discoloration of the metal surfaces. Low carbon steel was used in these experiments.

In formulating this slushing compound, the solvent oil used may be any of the usual light petroleum solvents such as petroleum naphtha, "varnish makers and painters" naphtha, Stoddard solvent, or any of the non-petroleum solvents usually used in such applications such as benzene, carbon tetrachloride, and others.

The usual preference will be for a moderately volatile light petroleum solvent, such as the well-known Stoddard solvent or the usual "V. M. & P." (varnish makers and painters) naphtha.

The wax to be used may be paraffin wax, crude or refined, or microcrystalline waxes of petroleum origin, crude or refined, or any mixture of these, or it may be the natural waxes of vegetable and animal origin, or any mixture of these with or without added wax of petroleum origin.

The characterizing feature of these wax emulsions is the presence therein of substantially more wax than is soluble in the solvent oil, the wax being held therein by a suspension agent. Thus, with petroleum solvents of the usual type, capable of dissolving only up to about 5 percent of the most soluble wax in the most effective solvent, the amount of wax will range

from upwards of about 5% to about 50% or more, a usual and preferred composition containing about 25% of waxy material.

The suspension agent may be an aluminum soap of any fatty acid, naphthenic acid or resin acid, and will usually be present in the finished composition in percentages ranging from about 0.05% to about 0.50% by weight. These percentages are adjusted to the amount of wax present, and are sufficient merely to hold the wax in suspension, and not to give a thickened or gel form of compound of high viscosity. It may also be any other soap of a metal which soap exhibits a gelling tendency when peptized in a hydrocarbon. For example, soaps of the above acids with sodium, potassium, barium, manganese, cobalt, and magnesium may be used. Such soaps may be termed gel-forming soaps for purposes of definition. Of such soaps, aluminum soaps are preferred.

We claim:

1. A slushing compound consisting substantially of a nonviscous light petroleum solvent oil, a waxy material of petroleum origin present in an amount of at least about 5% and substantially greater than can be dissolved in said solvent oil and less than one percent by weight of an aluminum soap, the said soap being present only in amount sufficient to maintain the wax in suspension.

2. A slushing composition consisting of from about five to about 50 weight percent of a mixture of paraffin and amorphous petroleum waxes, and less than one percent of an aluminum soap, the remainder being a nonviscous light petroleum solvent oil, the said soap being present only in amount sufficient to maintain the wax in suspension.

3. A slushing composition consisting of less than one weight percent of an aluminum soap, from about five to about 50 weight percent of petroleum wax, and a nonviscous light petroleum solvent oil, the said soap being present only in amount sufficient to maintain the wax in suspension.

4. A slushing composition consisting of not more than about one half of one percent by weight of an aluminum soap, about twenty-five percent by weight of petroleum wax, and nonviscous light petroleum solvent oil, the said soap being present only in amount sufficient to maintain the wax in suspension.

5. A slushing compound consisting of a nonviscous light petroleum solvent oil, a waxy material of petroleum origin, and comprising paraffin and microcrystalline waxes, present in an amount of at least about 5 percent and substantially greater than can be dissolved in said solvent oil and less than one percent by weight of an aluminum soap, the said soap being present only in amount sufficient to maintain the wax in suspension.

6. A slushing composition consisting of not more than about one half of one percent by weight of an aluminum soap, about twenty-five percent by weight of petroleum waxes, comprising paraffine and microcrystalline wax, and nonviscous light petroleum solvent oil, the said soap being present only in amount sufficient to maintain the wax in suspension.

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